

Enhancing Cartographic Time-series Animation

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Abstract. This contribution describes a design study of an interactive, animated cartographic time-series visualization. The visualization was created in collaboration with ecology modelers and forest managers with the goal of representing alternative futures of forest ecosystems based on a forest landscape disturbance and succession model.

Keywords: cartographic design, forest decision-support, interactive animation

1. Introduction

Recent research in cartographic animation has focused on comparing animated time-series to series of static small-multiples providing a very heterogeneous picture. Some studies describe cognitive and perceptual limits of time series animation, e.g. limited visual detection of change (Goldsberry and Battersby 2009; Fish et al. 2011) and complex spatial patterns and high cognitive load for making comparisons (Harrower 2007). Also, the efficiency of cartographic animation has been criticized, as watching a non-interactive animation as well as interactively exploring animations can be relatively time-consuming (Harrower and Fabrikant 2008). Other studies describe better and faster performance of test persons with animation when data patterns are strong and simple and viewing speed is adapted. Some authors have also pointed out the suitability of animated maps to show micro-change and motion or trajectories.

2. Motivation

While basic research is still trying to figure out for which tasks animation and for which tasks series of static maps are better suited, the enthusiasm of users for cartographic animation has been noted in almost all studies. As a consequence of this enthusiasm, cartographic animation as a means to visualize dynamic phenomena in time-series may be explicitly requested by project partners, and the question to use or not to use animation may not even be considered. In such a case, the cartographer is confronted with the task of improving and adapting cartographic animation so that known and assumed short-comings are leveraged and full use is made of the strengths of time-series animation. While the design of time-series animation has been a research topic in information visualization, digital education and human computer interaction, research contributions describing design improvements of time-series animation from a cartographic point of view are still rare.

3. Contribution

This paper describes a design study of an animated cartographic time-series visualization that was enhanced in different ways to help the user exploit the full potential of the medium, taking the state-of-research on strengths and weaknesses of cartographic animation into account. The visualization was created in collaboration with ecology modelers and forest managers with the goal of representing alternative futures of forest ecosystems based on a forest landscape disturbance and succession model. The authors explore how animation can be enhanced and combined with other representations in a meaningful way to allow the user to interactively explore the time-series and to identify sudden changes and trends. Explanations of the design considerations as well as a prototypical implementation of the visualization are presented.

References

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